

# SUPPLEMENT.

## The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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### Original Correspondence.

#### MINING EPISODES IN INDIA—No. II.

By GEORGE HENWOOD, Mining Engineer.

##### NAGPOOR—ITS MUSEUM.

Nagpoor is the principal city of the central provinces—it has been not improperly styled the "navel of India," and has for ages been the seat of an extensive native trade. As a mere traveller through the district, I shall not presume to treat of its present capabilities, future prospects, or past history; the last, I believe, is wrapped in oblivion, or clouded in mystery. Improvement, however, displays itself in every part; the opening of good roads, and the completion of the railway to this point, have completely revolutionised the affairs of this ancient and once great city—the future, to judge from the present, holds out every sign of hope. I was led to these deductions by a visit to the Museum at Nagpoor—a recent and worthy effort, exceedingly well carried out as far as it has proceeded; but, like many other young institutions of the kind, it has sustained a sad loss by the demise of a devoted, able, and gratuitous, therefore great, contributor, who bore the honourable name of Hawkins. He was to this institution what the late Dr. Paris was to the Royal Cornwall Geological Society, and others who have been in their days the pioneers of science and benefactors to mankind; their memories are enrolled in the annals of science and good works that perish not—far more noble memorials, and infinitely more enduring, than the glories of the splendid toy at Agra (the Taj) for its intended purposes. The name of Hawkins is familiar to Cornishmen. Query—Is this Mr. Hawkins a scion of the noble house of that ilk?

The Museum is located in a very good and handsome building, for India; well situated, and is comparatively rich in geological and mineralogical specimens of the produce to be found in the central provinces. Those most worthy of notice are the ores of iron; numerous they are, and of surprising richness, yielding, in some instances, as much as 98 per cent. of iron, nearly malleable in some specimens, having much the appearance of meteoric stones—these, however, have evidently been quarried from a lode. The natives by some means manage to produce excellent iron, charcoal being the fuel employed. Specimens of it, wrought and unwrought, show it to be a very tough, serviceable material, admirably adapted to their rude mode of forging. Red, black, and brown hematites are represented; clay-iron ores in profusion—these give results as high as from 70 to 80 per cent. The latter ore is so abundant that, were it eligible for consumption, the supply would be literally inexhaustible, even if the wants of the entire world were to multiply in a compound ratio for ever. In going over the pass in the Southpoora Hills I saw whole mountains consisting entirely of iron ore—millions on millions of tons, which need no mining. The natural disintegration of the joint or "heads" in the rock enable the blocks to be easily removed; indeed, too much so, as the rains in the monsoon bring down boulders in prodigious quantities. These are found in every valley, from a ton weight to a mere pebble. The study of these disintegrating rocks quite satisfied me as to the cause of rounded ironstones being frequently discovered in true lodes. Amongst the choicest specimens are surprising examples of onyx, agate, blood-red, green, and precious jaspers, good topaz, rock crystal, turquoise, and other gems, including garnet and cat's-eye.

Coal is only represented by a few specimens—these of inferior quality, but evidently from very shallow veins or seams, partaking much of the character of lignite and anthracite; the samples, however, give evidence of its existence, and their appearance warrants trial and prosecution at greater depths. Building stone, hone stones (much valued in India), limestone, marbles, sandstones, millstones, &c., polished and rough; in fact, as good a collection as could have been desired—far better than could have been expected in a jungle city. Woods and timber as cut, others planed and polished to show figure and colour; clays of various sorts, and the native manufactures therefrom; and last, though not least, is the wonderful native plaster, which, when carefully prepared, becomes as hard as the most solid stone; examples of some, known to be from buildings over 2000 years old, as perfect as if but yesterday wrought in. These may be said to comprise the main articles of the geological and mineralogical produce of the country.

The most curious specimens are, perhaps, the large number of idols, some perfect, others mutilated, that have been found in clearing the jungle, as well as slabs of stone containing histories, no doubt, written, or rather engraved, in characters now wholly unknown. They are beautifully executed, and are as sharp and distinct as on the day they were executed, on polished slabs of extremely hard basalt; out of the same kind of stone some of the figures are carved with wonderful delicacy, the carving most elaborate—the detail and polish are perfect. Some are very small, others of large size, but not gigantic, like the statues of Egypt. Most of them are of the Hindoo and Brahmin character, the elephantine trunk and form being predominant. To me it is surprising how these works were wrought at all in such remote ages by such rude tools and appliances as the inhabitants must have possessed. On enquiry I found that most of those which are perfect had at various times been discovered in the thick jungle; therefore, they had not been the objects of continuous worship or care. It further appears, by their great number, as well as by the large number of flint and jade implements, arrow-heads, &c., exhibited, that this part of India, now overrun with jungle, had anciently been densely populated. The manufactures in clay and terra-cotta, ancient and modern, display a certain degree of originality of design and of ornamentation, but the patterns are peculiar to the conventional Hindoo taste; they, however, constitute capital examples of the state of the ceramic art in these parts.

Cotton, flax, wool, and the native manufactures therefrom are well represented, as are also the cereals and articles of food. Natural history, too, is, as well it should be where such rare opportunities are afforded, largely displayed: the entomological examples and birds of

superb plumage, as also of reptiles, are innumerable. Native implements of war, from the most remote to the present period, are here to be seen. They afford a rich threat to Europeans, from their curious forms and make. Some of the damascene would rival the best works of Toledo or Damascus itself; the inlaying of silver in sword and pistol hilts is really a work of art and taste. The collection, as a whole, is an honour to its founders and a credit to Nagpoor, well deserving the liberal support of all who desire to see a nation advance in civilisation and wealth. By far the most pleasing sight to me, however, was to view the large number of natives who attended, and to read the numbers of those who inscribed their names as visitors. Those present evidently took great interest in all they saw, making frequent enquiries respecting anything they did not understand. I learned from the person in charge, who acts as curator, that since the Museum had been opened gratis thousands of the people had attended, and that they had never missed a specimen, nor had the slightest damage to any work of art or plant been done, nor had they to complain of misconduct on the part of the visitors, all of whom came decked in their "bit of best"—that there was not the slightest necessity for any police or protection, although a policeman was usually stationed there, for dignity and appearance sake.

Now, most of your readers will join with me in wishing success to the Nagpoor Museum. We have witnessed in Europe what exhibitions have done. It is to be hoped the same good influences may be set to work in India, and that those efforts may be the means of developing in some degree, by diverting attention thereto, the once celebrated and proverbial, now neglected, riches of the East in metallic treasures—of which subject more anon.

#### MINE INSPECTION—CIVIL SERVICE EXAMINATION.

SIR,—The first complaint which "Nemo" makes is that rumours were circulated before the appointment of an Inspector to succeed the late Mr. Verner had been made, and that these rumours subsequently turned out to be unfounded. This "Nemo" (who, it must be assumed, believed the false rumours) considers to be proof that the Home Secretary made an injudicious appointment. How the conclusion follows from the argument I must admit I cannot see. However, I can gather from "Nemo's" statements that the two gentlemen whom rumour appointed, without the sanction of the Home Secretary, were the subjects of adverse comments in the district. Probably the Home Secretary thought the fact of a man being a "decent fellow" was not sufficient evidence of his fitness for an Inspector, and, therefore, adopted the wiser course of ascertaining the qualifications of the candidates before making the appointment. This fact may also account for the long period of six months elapsing between the death of Mr. Verner and the appointment of his successor. As to the difficulty of the Civil Service Examination, "Nemo" much overrates it. It is simply sufficient to prove that the candidate has received an ordinary education; and, considering that a Government Inspector is necessarily brought into contact with gentlemen as well as with workmen, it is essential that he should be himself a gentleman. But "Nemo" may rest assured that the Civil Service Examination alone will not be of much service to the candidate for an Inspectorship, and that the authorities use every effort to appoint one that will give satisfaction to the largest possible number of those interested.

London, Dec. 9.

R. A.

#### WORKING COLLIERIES IN SOUTH WALES.

SIR,—Will you kindly insert the following letter in reply to one signed "A Collier," which appeared in the *Cambria Daily Leader* on Nov. 30?—Cardiff, Dec. 9.

JOHN NIXON.

SIR,—"A Collier," in the above-mentioned letter, is altogether in error. He has either wilfully misrepresented or misunderstood the purport of my letter. My object is to save life, and not to increase the "get" of coal, or gains of the colliery proprietor.

In the double-shift coal is drawn from the pit during only 12 hours out of the 24, as at present, and it is not proposed to increase the quantity of coal raised per day.

A collier in the first shift will have ample time, with ordinary exertion, to fill up the whole of the coal he has fairly worked; but even in case he should not, he will have the option of choosing a partner who takes his place in the second shift. No one would think of interfering with his choice, and surely amongst hundreds of workmen others can be selected equally as good and trustworthy as himself in every respect. In the North of England there is found to be no practical difficulty in this matter, although the coal there is much more difficult to "cut," and requiring a much greater effort to sever it from the solid bed than that of South Wales. Are Welsh colliers inferior in any respect to Englishmen? Can they not trust each other to act fairly, and do what is right? I have a much higher opinion of Welsh workmen than the person who signs himself "A Collier."

With regard to defective ventilation, I can only say that the colliery proprietor who studies real economy will not neglect to employ every practical means in his power to ensure the freedom of his collieries from explosions, if he had no other object than merely the saving of his own pocket. One severe explosion will entail a pecuniary loss which will require years of profitable working to make up. It hangs like a funeral pall over the pit for a long period, if it, indeed, ever be entirely removed. So far as I am able to judge from the reports which have reached me, Ferndale Colliery most assuredly did not come under the category of want of ventilation. There were, I am told, 120,000 cubic feet of air passing through the workings per minute; and probably in the whole of the South Wales mineral basin there are not more than half-a-dozen collieries which have an equal amount. This colliery was divided into districts or "panels" (another precaution against loss of life from explosions)—locked safety-lamps exclusively used; yet with all these appliances and precautions what is the result? A loss of life little short, probably, of 200 human beings, one half of whom would have been saved had the colliery been worked on the double-shift of the North of England instead of the single-shift system of South Wales.

From personal experience, I know that no amount of precaution

on the part of the colliery proprietors can prevent explosions. I have known an outburst of gas which in a moment rendered inflammable a whole district, and fouled from end to end all the working places of that part of the colliery, although a current of air of 20,000 cubic feet per minute was passing through and sweeping every part of the workings. That current remained in an inflammable state for 600 yards from the place of its outburst for more than twenty-four hours. Of course, nearly every man's lamp in the district was on fire, and had there been one defective lamp, out of perhaps fifty or sixty, or even a perfect lamp in the hands of a careless workman, or had any collier been in the act of smoking, or had removed the top of his lamp, an inevitable explosion, and a dreadful loss of life, would have been the consequence.

I say, most distinctly, we cannot prevent explosions; but I say, at the same time, we can greatly diminish them in number by a proper organisation of labour, and a change from the single to the double shift mode of working.

The letter of "A Collier" proves to a great extent what I say is necessary—that nothing short of parliamentary enactment will insure a prompt adoption of the double-shift system of working collieries in South Wales, and it behoves everyone who has the welfare of his fellow-creatures at heart to aid and assist in its speedy introduction; for any day, let it be borne in mind, the Ferndale catastrophe may be repeated, and let "A Collier" reflect that either he, his sons, or relatives, may possibly be amongst the next victims.

JOHN NIXON.

#### PETROLEUM AS STEAM FUEL.

SIR,—The principle on which we burn oil as fuel for steam-raising purposes is by injecting oil and steam into a red-hot retort (either fire-clay or iron), and converting the oil into gas. We lead it direct from the retort to two pipes below the retort, which are perforated. The vapour burns with great intensity, and if the retorts are kept up to the proper heat no residuum is left; the burners are placed immediately below the retort, so as to keep the retort to the required heat. In our yacht we first heat the retort by a liberal use of wood, saturated with oil or waste; the oil then goes into the retort by gravitation, and makes a gas which burns with rather a smokey flame, but as soon as we get steam, we lead that into the retort along with the oil, through a sort of Giffard's injector. This at once intensifies our heat, and clears the flame. My theory is, that the oil and steam are decomposed, the hydrocarbon burns in its natural proportion, the surplus carbon, of which there is a large excess, is taken up by the released oxygen from the steam, leaving pure hydrogen to burn alone. However, the yacht now lies in Woolwich basin, and we are at all times glad to offer facilities for witnessing the trials. Our results have been so varied that I do not like to give them. I should say 18 lbs. to the 1 lb. of oil will not be far from right. We steamed from Hungerford to Woolwich yesterday in one hour and a quarter, tide against us; as far as Blackwall 50 lbs. to 60 lbs. pressure the whole way. I may mention that I melted some iron with a flame obtained by this method in a puddling-furnace at Govan Ironworks, in 1865, and am told that it produced first-rate iron out of some very common raw material.

ARTHUR BARRETT.

92, Cannon-street, E.C., Dec. 11.

#### THE QUEBEC HYDRAULIC CEMENT.

SIR,—However small the credit to be attached to the fact that I was the first, so far as I know, to ascertain that a large portion of the black rock of Quebec was convertible by the usual process into hydraulic lime, I claim it. On more than one occasion before you have kindly lent me the use of your columns to establish this claim, and have in them yourself expressed your opinion of its justice. The Supplement to the *Mining Journal* for Dec. 1, 1866, contains one instance of this kindness, and the article referred to having, at my request, been copied into the *Quebec Morning Chronicle*, was replied to with unnecessary harshness by Mr. Gauvreau, who, not satisfied with having profited in a pecuniary sense by my labours (having ignored and pirated my patent and discovery of nearly 20 years priority to his), is probably about to make the attempt to get his patent and usurpation renewed, which will expire on April 5, 1868. Now, as I have before observed and published, I do not question Mr. Gauvreau's right, nor that of any one, to manufacture hydraulic lime or cement from the black rock of Quebec, because any "exclusive commercial rights" I may have possessed by virtue of my patent dated Oct. 11, 1834, lapsed in consequence of non-renewal in 1848. But, surely, if I possess none Mr. Gauvreau cannot possess any, for the fact of my not having taken commercial advantage of them while in my possession does not justify him in claiming them when I was no longer so, no more than it does his claim to be considered the discoverer. My position at the period of the discovery, as an officer of the army on service, is a sufficient reason why I did not do so; but, the fact is, my only object at the time for taking out the patent was to secure the credit, so far as it existed, of having discovered that large portions of a rock, very inferior as a building stone in its natural state, were convertible into so useful an article as hydraulic cement; and it is only to that credit, slight as it is, that I now make any exclusive pretension.

The harsh expressions Mr. Gauvreau has introduced into the communication in answer to mine, to which I have alluded, are evidently the result of my having supposed that he had assisted me, as mason and labourer, in building and loading my small kilns of experiment. Now, certainly I may be mistaken in entertaining this belief, although Mr. Head, a clerk of the works in the Royal Engineer Department, recently stationed at Quebec, thinks I am not, for he writes, in answer to some enquiries of mine on the subject, as follows:—"Mr. Gauvreau was, from what I can learn, a working man-on at the time you mention, being employed in the Government works at Quebec, and then residing in or about St. John's suburbs. Mr. Gauvreau being now employed as architect and surveyor in the Provincial Board of Works Office, Quebec."

Mr. Gauvreau has evasively denied that he assisted me as a la-



boursier when making my experiments to establish the discovery. Was it as a mason only he did so? However, to the best of my recollection, it was "one Gauvreau" (whether himself or another) who assisted me in both capacities. Another extract from Mr. Head's official letter to the C.R.E. of Quebec, dated Feb. 25, 1861, shows that Mr. Gauvreau does not dispute my right to be considered the original patentee, but states "that he obtained his knowledge of the properties of the black rock stone for making cement during the great fires in the Quebec suburbs in 1845," conveying the idea, I presume, that a portion of the rock had been converted into cement stone by those fires; which, indeed, might have been the case, as, no doubt, the heat was great enough. It is, however, a curious way of accounting for his "knowledge," and quite unnecessary, as there are better ways, one of which he has given in his reply to my communication, although it seems to contradict the former way of accounting for it. It is as follows:—"The history of this famous cement is this—In 1853, seeing that the corporation here was using a very large quantity of cement imported from the United States, at the high figure of \$4 per barrel, for waterworks and drainage of the city, I felt convinced that some of the different stones in the vicinity of Quebec might be made to produce a good cement; I, therefore, had a collection made of all the different sorts of calcareous stones about the city, and, after a number of experiments, I found out of my collection three different sorts of stone from which a good cement could be made; all the others only gave common lime," &c. Now, what I may ask here became of the "knowledge" Mr. Gauvreau obtained in the year 1845, in consequence of "the great fires in the Quebec suburbs" during that year, if this be "the history of the famous cement?"

In the same communication Mr. Gauvreau has introduced very rude remarks with reference to my suggestion that the cement itself, instead of stone from the Beaufort and Carrouge quarries might be substituted in the renovation of the recently burnt suburbs of Quebec, a suggestion which, whether reasonable or otherwise, seems to favour his mercantile speculations, and was at least entitled to a courteous reply, if any at all were given to it. His objection, founded on the supposition that the cement is not abundant, in my opinion, is entirely unfounded, as I believe it to be abundant, but variable in quality. Throughout the whole of his communication he pretends to be under the belief that I am not the writer of the communication he is answering, and indulges in some flummery nonsense in the beginning of it about himself, about the officers of the army, their courtesy to him, particularly that of the Royal Engineer Department, fearing, perhaps, to lose the custom of the latter if too insolent to one of its members.

To suit his purposes, Mr. Gauvreau gives a garbled or abbreviated extract of a letter from me to the *Quebec Morning Chronicle*, the inference he draws from which is quite erroneous, as will be perceived on reading the whole letter. He appears to be equally in error in supposing that cement from the "black rock" of Quebec is manufactured only by himself, and in consequence of that supposition inferring that the justness of his claims is acknowledged by the Quebec public; for the fact is, as I understand, that this cement is now manufactured by the Royal Engineer Department there, as, indeed, it ought to be, as well as by others of the Canadian public, in justice to whom, as well as to myself, I have submitted to the Attorney-General of Canada the question of Mr. Gauvreau's right to have his patent renewed, should he make the attempt to get it effected after April 5, 1868. Trusting that the enclosed copy of a letter from myself, dated Nov. 3, 1864, will not be considered *de trop*. I send it, hoping that you may be induced to publish both it and this communication in an early number of your valuable Journal, and by doing so increase the obligation I am already under to you.

The specimens of stone from the Black Rock of Quebec which accompanied those of cement sent to Colonel Ellescombe, R.E., in 1854, were submitted to Colonel Wasley, R.E., for examination, who reported in substance as follows:—"That, although none of them when burnt and pulverised would, with the addition of water, give a cement fit for outside tidework, yet some of them, after time was allowed for setting, became unusually hard and insoluble, resisting the oxalic test, which, according to him, none of our best English hydraulic limes would do. He gave me credit for ascertaining their hydraulic character, which their slow setting in water would have concealed from himself."

F. H. BADDELEY, Major-Gen. R.E.,  
Original Patentee of Hydraulic Cement from the "Black Rock" of Quebec.  
[Major-General Baddeley has forwarded us a large number of original documents from Canadian officials, containing all necessary proof that the alleged invention of Mr. Pierre Gauvreau, patented in 1854, was identical with that patented in 1844 to Major-General (then Lieutenant) Baddeley, R.E., and that the said Mr. Gauvreau, being then a working mason employed on the Government works at Quebec, had every facility for ascertaining the nature and extent of Lieut. Baddeley's discovery. These facts Mr. Gauvreau does not appear to dispute, his contention being that as Baddeley's patent had expired 13 years, five years only before his was applied for, there was no patent in existence when his (Gauvreau's) was granted, and that, therefore, it is valid. The views of Canadian lawyers upon the question are not known, but the theory upon which patents are granted in other countries is that the patent to an inventor for a limited term is given as an equivalent for the purchase, on behalf of the public, of the invention in perpetuity from the date of the expiration of the patent. Assuming this principle to be recognised in Canada, it is difficult to understand how any exclusive right can have been acquired for Baddeley's discovery since the expiration of Baddeley's patent in 1848.]

#### THE WEST INDIAN ISLANDS—No. II.

SIR,—I trust that most of your readers who are acquainted with the local features of these islands will be able to appreciate the great practical advantages derivable from such a mode of construction of both public and private buildings as would ensure ample security to life and property during those trying hurricanes. The configuration of the surface in many of these islands (St. Thomas, for example), is mostly such as to almost involuntarily lead an observer to the conclusion that if a storm—a terrible hurricane—were to blow from a given direction, there would be many spots on the surface of the island where the pressure of the volume of air, proceeding at immense speed, would be greatly intensified by the influence of the sides of the hills, and the shape of the slopes and ravines, and where, hence, no wall, excepting it be of unpractically great thickness, could withstand the pressure of the hurricane. I have seen the remnants of walls of above 2½ feet in thickness which had been blown down. If we were, now, to lay out the town in streets of single rows of houses, the said streets being disposed in the shape of inclines and terraces, excavated along the sides of the surrounding hills, it will be obvious that even the most violent hurricane could not do much damage, simply because the houses present very little surface to be acted upon by the wind, and, owing to the very circumstance of the houses lining the sides of the hills, they would naturally be removed from those spots where, owing to the influence of the configuration of the surface, the focus of intensity and force of the hurricane may be said to exist.\* The rocks mostly appear to be of a dry character, and by using all the modern improvements and appliances in properly arranging ventilation and drainage, and employing waterproof cement and plaster, the semi-interred terrace dwellings may be made perfectly comfortable and healthy, and safe against moisture. Besides, those who can afford it might have their villas wherever they chose, and could reside there during the safe seasons. It may, with truth, be objected that such semi-subterranean dwellings, &c., would be very unsafe and dangerous during earthquakes; but at such periods no dwelling, of whatever shape, would be safe; and, as a rule, earthquakes appear to be of much rarer occurrence than hurricanes in those parts. And in the case of an earthquake occurring, the very circumstance that the majority of the dwellings and stores of the inhabitants are arranged in terraces along the sides of the hills would, in fact, tend to ensure greater safety to life, inasmuch as then the inhabitants could take refuge with their valuables, &c., on those then open and free spaces which, under the present system, are generally covered with buildings, and the which lower spaces, on account of consisting of what I should call more settled, tougher rocks and sedimentary formations, would be less violently affected by the oscillations of an earthquake. It will hence be seen that, by acting up to my suggestion, a greater security to life and property is ensured in

\* I cannot help looking upon the atmospheric fluid which surrounds our globe as being subject to similar laws with the aqueous stratum to which it is superincumbent. Hence, an immense volume of denser air caused to pour over the West Indian Islands would, owing to the high hills which there interrupt it, be in many localities greatly intensified in its force; the sea presenting an oscillating, but, as a whole, *inelastic*, plane, would hence only tend to increase the pressure of the hurricane.

any case; while if the present system of laying out the towns is persisted in, there will be always lives and property lost during any hurricane; and in the case of an earthquake, life would be endangered by falling buildings in those very spots which would otherwise be safest, the falling of houses compelling the inhabitants to fly thence to the hills, there to perish by loosened masses of rocks. Lighthouses, in the shape as hitherto constructed in those islands, are almost, as a rule, blown down by hurricanes even of inferior force; but if they were constructed in the shape of *cones* with *extraordinarily large bases*, those important structures would have a chance of outliving even very heavy hurricanes, as their being thus constructed enables them to offer far greater resistance to the (owing to the rapid succession of "air-waves" of variable density) almost *battering ram-like* blows of the hurricane. A section of such broad-based conical lighthouses should, as nearly as possible, present the shape of an equilateral triangle (the base with the inside at 60° angle).

Considering the increasing importance of the trade with those parts of the western hemisphere, a trade which as yet is only in its infancy, and whose importance will vastly increase in proportion to the increase of population of the adjoining countries, and in proportion to the all-important and unavoidable increase of the facilities which obviously must be afforded to the transit of a vast universal traffic across the Central American Isthmus, it is a matter of surprise that the skill and ingenuity of man should have hitherto done so little in taking defensive measures against those hurricanes, and that in erecting the various structures in connection with the shipping, &c., no notice should have been taken of the periodical occurrence of such catastrophes. I contend that, after observing carefully the *local* direction and *foei* of the hurricanes, certain spaces in the harbours, &c., of those islands could be chosen, and could be protected against the hurricanes by means of appropriate structures calculated to break their force *locally*. If those islands were thickly planted with forests, the forests might here and there tend to break the force of the blast, but the chances are that the trees would be uprooted, and the danger to living beings increased. I cannot, however, help thinking that there are certain kinds shrubs and trees which might stand a chance of successfully facing even a West Indian hurricane. The African ebony tree, for example, would, from the pliability of its branches, and the angle and position at which from childhood it adapts its trunk to the prevailing—sometimes, indeed, most terrific—winds, have a chance of prospering in the West Indies, and its cultivation would in time not prove unprofitable. But for the protection of valuable ships, docks, &c., I should suggest the erection of vast iron (may be part wooden) frame structures, calculated to break the force of the hurricane in certain spots. The construction of these "break-storms" should be such that they present to the current of the wind a similar breaking resistance as a forest of high trees would do; or, better, as a floating framework-breakwater would present to the sea waves. The whole structure would consist of a labyrinthine framework of numerous bars, tubes, and chains, so disposed that neither of the component parts would offer a large surface for the hurricane to press upon, all parts being firmly secured and connected together; the whole structure reaching to a considerable height, and covering a sufficient width and length of area so as to cause the rushing air to filter through it: its many component parts presenting an endless variety of deviating surfaces to the current, a multiplicity of counter currents thus created causing the whole to issue on the *inner* side of the protecting structure with very considerably diminished force. Let our engineers remember that air is a fluid, and let us treat it as such in our precautionary measures against the ravages of hurricanes.

Dec. 11.

G. J. GUNTHER.

#### GOLD MINES OF CANADA.

SIR,—Last week a few items of intelligence were written and about to be posted for you, when a strange rumour came out of Madoc. The manager of a company working within the limits of the Richardson farm had brought to the assayers 20 lbs. of rock from a new shaft. It yielded gold at the rate of \$10,000 to the ton of quartz. Another company sinking a shaft within a few hundred yards of that amazing treasury, had, at the depth of 60 ft., abandoned their workings as barren; but now they intend to continue. Messrs. Taylor and Scott have a crushing mill at Madoc, and work for customers who bring ore to the mill to be pounded and assayed. From a new shaft at El Dorado they reported on Nov. 13 that ore treated at their mill had yielded \$53 per ton. This is a modest amount compared with the great strikes, but is far above the lowest limit of profit. That limit seems to be fixed at about \$12 per ton; any yield of gold below that amount does not pay for working with the present means of assaying. The great stamping mill of the Richardson Mine is not yet completed. Mr. Gilbert, of Montreal, an eminent steam-engine builder, has the contract for this gigantic crusher. Its stamps are to be in the aggregate equal to 40 tons. The latest account which I have obtained bearing the guarantee of known and trustworthy names is that Taylor and Scott, four days ago, crushed and assayed ore which yielded at the rate of \$154 to the ton; but against these strikes a considerable number of deep shafts must be balanced which as yet are barren.

Prof. Chapman, of Toronto University, has published a letter explaining that in advising a company to cease working their 60-ft. shaft last week, he did so not from concluding that no gold could be found, but that they having small capital had better rest until richer companies around them had tested the rock at a lower depth. These items are necessarily given you in a desultory shape, and with my hesitation for the present to endorse the \$10,000 a ton rumour, are not so exact as readers in England would like to see. But soon I shall be amidst the mines, and will acquire larger information. I have been detained in the West, at the town of Guelph, watching the progress of an invention which, if it turns out a permanent success, as it promises to do, will be of a higher service than even mines of gold. This is Smith and Robertson's Oil Injector, for applying petroleum to engine furnaces as fuel. ALEXANDER SOMERVILLE, Hamilton, Ontario, Nov. 20. "The Whistler at the Plough."

#### THE PROGRESS OF MINING—AS A SCIENCE, AND SOURCE OF COMMERCIAL WEALTH—No. XXII.

SIR,—Mines with Dividends in Abeyance: From the ordinary list of mines before the last great panic had played havoc with all sorts of properties there were thirty mines in the catalogue with dividends suspended. There is a peculiarity about the character of those mines deserving profound consideration. On the average, they only took, in original outlay, a sum of 12,766*l.* each, while the mines with continuous dividends cost 24,300*l.* each; but these mines have paid 103,666*l.* each in dividends, while those in abeyance have only paid 34,622*l.* each. The whole of the dividend mines, with dividends in abeyance, have cost the country 383,000*l.*; and the dividends derived from them have amounted to 1,039,000*l.*; this sum, divided by twenty years, would give a little more than 50,000*l.* a year profits, or about 13 percent. per annum for the money invested. The mines with continuous dividends cost the nation 1,484,000*l.*, and have paid dividends to the extent of 5,598,000*l.*; this gives an annual dividend of 279,900*l.*, or nearly 300,000*l.* a year, which is equal to an interest of nearly 20 percent. on the capital. It would appear from this deduction from the statistics of mining that, like all other sublimity things, mines, in order to be good and substantial, must cost a great deal of money in the beginning; but yet it is difficult to trace the analogy, as great masses of ore often come up to the surface, and prove very lasting; and the Devon Great Consols, the pet mine of statista and investors, on a very small investment, has paid immense annual interest, and has continued to do so for nearly twenty years, while the reserves guarantee great profits for many years to come. Nor is this a solitary instance, as the same may be adduced as to Wheal Seton and other mines in West Cornwall; but, no doubt, on looking the matter fairly in the face, we shall find that where mines come into early profit the proprietors are sometimes too anxious to divide the profits, and neglect to erect such machinery and to carry out such underground trials as would give greater stability to the work, and they, to some extent, diminish the chance of long-continued dividends. During my stay in West Cornwall, the other week, I went over the St. Aubyn and Gylla Mine, a mine that had produced some good profits, but at present with dividends suspended. I found in the western part of the mine two very fine rotative engines, capable of reducing

a great amount of tin, but their services were not wanted at that time; I, however, found a similar engine in the eastern part of the mine, engaged in pumping the water, taxed almost to the utmost extent of its power; the underground water in this mine seems more than a fair proportion. These mines, now called the Great Western Mines, are situated at the western foot of the great granite hills of Breage and Germoe. These great stanniferous measures, that have produced such great fortunes in Wheal Vor, and the great works here in this situation, which is certainly a splendid position for a mine, being on a parallel of the rich copper mine of Wheal Speedwell, on the south, and various good mines, such as Wheal Friendship and Crystal on the north, the upper strata contained lodes yielding down to the 40 as much as 30*l.* and 40*l.* worth of metal to the fathom. I could not help reasoning to myself, as I passed over the portion of the mine in which those splendid engines, now idle, were erected, and, according to my judgment, most judiciously placed, that if there had been a more powerful pumping engine on the eastern part of the mine, well capable of dealing with the underground water, the excuse, or rather reasoning, as to the western part of the mine having become poorer in depth would prove to be only one of those deceptions that blind the adventurer and working mines alike. Who has not heard the working miner, when sinking a winze embarrassed by water and troublesome to work, advocate its suspension on the plea that the lode was growing impoverished? For my part, I could not bring my mind to receive the argument that those rich formations of rock, now getting down on a level with the rich copper-bearing beds of Wheal Speedwell would be found less productive than those that had made such good profits in the upper sections of the mine. This ground is traversed by elvan courses, and situated immediately to the east of the Wheal Neptune district, now attracting attention from the recent discovery of rich grey ore above the sea level.

It is difficult to conceive a mine better situated, in a geological point of view, for giving large returns of metal. The grant is a very large one, and traversed with at least three productive lodes for its whole extent. The back of the 30 fm. level, on Fisher's lode, is nearly all taken away, and the bottom of the level for a distance of 62 fms.; the lode has all been taken away for tin for about 4 fms. deep, and has yielded from the elvan course, 20 fms. west, 25*l.* per fm., the next 20 fms. west 10*l.* per fm., the next 12 fms. 15*l.* per fm., and the remaining 10 fms. 7*l.* per fm. There are 20 fms. west of this shaft now available, which can be worked to a good profit; and by extending the bottom level into the elvan course would open a piece of lode worth 4500*l.*, according to the valuation of the agents, at the present price of tin. Near Thomas's shaft there is a deposit of tin that at 17 fms. from the surface was only 10 fms. long, which in 20 fms. sinking had lengthened to 50 fathoms. This profitable lode, in this place, can be worked for 6s. 8d. in 1*l.* while ore ground continues in whole ground to the eastward into a forefield, beyond all the present workings. In order to take the benefit of these great deposits of tin, lengthening and improving as they go downwards, it is only necessary to procure increased pumping power, which possibly might cost 5000*l.*, but which it is quite fair to estimate would leave profits, from the ore ground seen, of more than cent. per cent. per annum on the outlay. Nothing can be more evident than the fact that St. Aubyn and Gylla, or the Great Western Mines, may be either dividend mines, or mines with dividends in abeyance, at the option of the shareholders, a fact that speaks well for this class of property collectively. M. F.

#### INCREASE OF PUBLIC INTEREST IN MINING AND MINING DISCOVERY.

SIR,—It is very remarkable that although mining has been so identified with the progress and prosperity of England yet so little importance is attached to it in the discussions on subjects of political economy in the Houses of Parliament, Chambers of Commerce, and the Press. Even the *Economist*, the *Bullionist*, and the *Money Market Review*, which professedly treat upon commercial and politico-economical subjects, rarely ever have an article or even a paragraph about mines. Last Saturday, for a wonder, the last-named journal had an article on the mines of Mexico, which was well conceived, and well expressed. I have noticed that in our ordinary political newspapers of late, however, some notice is taken of mining matters, and in the columns of their leaders, not merely in the City Article where the dealing in mining shares upon the Mining and Stock Exchange must, of course, be reported. The distress which succeeded the collapse of so many Cornish mines undoubtedly drew public attention to the importance of that branch of production, manufacture, and commerce, for it is all three. The amazing progress of several of the ports in South Wales depending upon the anthracite and iron of the district, and the business of smelting, also forced the general public out of its apathy and indifference to mining. The question of our coal supplies, lately discussed at such length in the *Mining Journal*, has probably been the occasion of assisting in forming this state of mind, so that the recent coal discoveries in Shropshire, Staffordshire, Nottinghamshire, Yorkshire, and Scotland have been all made the subject of congratulation, not only in the columns of the local papers, but also in those of the London Press.

An instance or two of the tone and spirit of some remarks lately made in the newspapers will be gratifying to you, who have done so much for the mining interest by devoting to it a journal so ably conducted. One of your contemporaries, in a conciliatory and clever article as to the future of Ireland, argues that her agricultural and mineral resources must be developed, as "no people will continue loyal in rags and famine." In pursuing his topic, the writer compares the progress of other portions of the United Kingdom, and positively attributes to the development of their mines the increase of comfort among the poor, progress in civilisation, and advancement in manufactures and foreign commerce. "The Scotch," observes this writer, "were a backward people until the invention of the hot-blast gave an impetus to the iron trade, and caused Scotch mines to furnish, both directly and indirectly, remunerative occupation." Although we cannot concur with the writer that Scotland was a backward country up to the period of the invention, or discovery and application, of the hot-blast, there is no doubt that, from whatever cause the mining industry of Scotland received its impulse, the development of that industry has been the main influence by which the wealth, civilisation, and power of the people of North Britain have been increased. Another passage from the same writer will also strikingly illustrate the increasing intelligence of our journalists on mining subjects, and their augmenting interest in discussing them—"England, at a very early period, received cloth manufactures from the Flemings, at a later period she imported silks from the French, and long before either, her mineral wealth was partially explored and worked, manufacturing, maritime occupations, mining, and agriculture, accompanied by an early and considerable foreign trade, marked her history and progress." "For a long time the Welsh did not emerge from barbarism, and only with the rise of the modern coal and iron trades have the valleys of the Principality been the abodes of a decently-paid and contented population."

All this, Mr. Editor, is true, and the argument unanswerable, but the wonder is that the whole press of the metropolis should have so long left the *Mining Journal* alone to teach those truths. In an Irish paper the other day, the editor of which, I believe, is Sir John Gray, there appeared the following:—

Among the best ways, those of most immediate benefit, and of advantage the most lasting, by which the comfort of the Irish people and the prosperity of the country may be promoted, is the thorough exploration of her mineral resources, and the employment of her population in working them.

It is also an important truth that a commercial country so great as England derives advantage from the development of mineral wealth in the countries with which she trades. Thus, we know that if she imports Straits tin, the use of English tin is necessitated, and so in various other cases our own mines have been better employed by the very circumstances which seemed to be pregnant with injury. In a recent letter I called your attention to the rich mineral resources of the countries fringing the rivers Paraguay, Parana, and Uruguay, whose waters are poured into the mighty La Plata. From recent intelligence received by me I can say, on the best authority, that new and most important discoveries have been made there. In Paraguay, which is more remote than the other States, there has been a fresh discovery of iron, the quality of which for making steel is



not surpassed by any other in the world. But for their iron mines Paraguay could not have resisted the "unholy alliance" formed against her independence and her free commercial systems. In the Banda Oriental, although the political condition of the country is so desperate—Flores, the Dictator, supported by Brazilian troops, crushing out every spark of liberty—explorations for silver and copper have been attended with success. The Argentine Confederation is also in a situation unfavourable to the development of any industry; yet there, also, in the midst of civil war from Corrientes almost to Buenos Ayres, and a national war raging along her borders, the work of exploration has gone on, and been richly rewarded. Silver has been discovered in the neighbourhood which was once so famous for its produce. Copper has been discovered "of great richness." But where no explorations were intended a vast mine, or rather region, of mines of coal, bituminous and of the finest quality, has been found, "enough to last the Confederation for 100 years." This discovery was made at the end of September, in the province of Mendoza, and on Oct. 10 specimens of the coal were examined in Buenos Ayres by a number of scientific and commercial men. This will be beneficial to our commerce with the Confederation for other metals and other materials. The possession of coal will enable the people of that country to work their mines more cheaply and expeditiously. It is a singular thing that a very much larger proportion of British ships leave Buenos Ayres and Monte Video in ballast than of all other ships trading there. This may partly arise from the fact that the English have been more accustomed to go up the rivers into the interior of the different States than either the French or the Americans, but it also arises from the fact that "the balance of trade" is against Buenos Ayres and Monte Video, and the Paraguay river is closed against the ships of all nations by the terrible naval and military operations now conducted there. The demand for the goods of Europe and the United States exceeds that of those countries for their produce, which the discoveries of coal, iron, silver, and copper will speedily adjust, partly by the export of these minerals, and partly by the influence of these discoveries upon productions generally. Nearly one-half of the wool exported to Europe goes to Antwerp, and less and less is sent to England. The result is that gold and silver are sent out of all those States to pay for imports, so as to leave little of the precious metals behind. The increase of mineral produce, such as will ultimately take place, will promote commerce with England, France, and the United States. The prospects of mining throughout America show that all those peoples, from New England to La Plata, are awakening, or rather have awakened, to the great advantage of mines to any nation. THOS. SPARGO.

Gresham House, Old Broad-street, City.

#### THE SLATE TRADE IN NORTH WALES—No. XI.

SIR,—I am quite aware that the present system of letting slate "bargains" cannot be changed, without annoying a certain class of the workmen; yet, when the subject is impartially investigated, every candid and honest mind is forced to admit the justice and propriety of the alteration. No enterprise can long prosper where the gain is all one-sided, and especially if it be obtained by sacrificing the interests of those who give it life. There can be no doubt that the present ruinous method of letting slate "bargains" to anyone who offers to work them cheaply has been largely introduced in consequence of the appointment of sophisticated agencies; but we purpose now to recommend a course which will remedy these misfortunes, and open up a highway to most beneficial improvements. The change to which I would direct attention will tend ultimately to better the condition of both men and their employers, which can be easily shown, although each may not immediately participate in the good resulting from it. In every kind of undertaking we must sow before we can expect to have the pleasure of reaping; we also accept the rule that those who sow sparingly will reap sparingly, and *vice versa*. This being generally understood, one can safely infer that the rule applies to every kind of industry. It is no less true that the advancement and success of the parties engaged will be in proportion to the tact and aptitude brought to bear in the use of the means employed, and it ought not to be imagined that it should be otherwise with reference to quarry operations. How often do we find in this business lads of only sixteen years of age more sensible and able operatives than men who have had 30 years' experience. Shall the former, because of their youth, be deprived of rights to which they are justly entitled? Or shall the latter, who have not acquired more knowledge than the former, be considered more eligible for a position of responsibility, simply on account of their years? The latter class will, no doubt complain (on account of the change) that they are indifferently dealt with, but by setting before them the cause of their misfortunes they may be urged onwards by a determined resolve that will soon entitle them to consideration and advancement. In truth, by the method which I advocate they would be properly and impartially treated, and it would require on their part vigorous physical and mental application to rise to a position which would secure to them approbation and reward. It may be asked, How do you account for the very large proportion of unskilled workmen in a quarry, and why is it that they remain so long ignorant of principles necessary to be understood in their profession? The answer is simple: they entertain too early the notion that they are thoroughly qualified for their duties, and that they know as much as those under whom they are employed, at a given rate of wages; thus, being inflated with ideas of their own sufficiency, they grow discontented, and consequently soon appear in the capacity of contractors, and, if successful in obtaining a slate "bargain" on their own account, they at once take to themselves credit for having acquired the necessary accomplishments for conducting the art. The door once being opened, applicants of the same order appear in the same character, until able contractors find it impossible to keep men at a fair rate of wages; hence, to retain their staff, they must either make them an advance, or seek out a class of men as partners in all respects equal to themselves. If they make the men an advance they know that they themselves will become losers, it being an excess of pay for the labour performed, and if their request be not complied with they commence on their own account. This state of things having been encouraged by the agent, you have at once a solution of the question of incapacity on the part of a very large proportion of those persons who have the entire charge of "slate bargains."

This extremely objectionable mode of setting the work requires an effectual modification, and which might be obtained by adhering to the following rules:—1. The manager should make a note of all the able workmen and slate-makers under his charge.—2. He should compute the number of slate "bargains" at his disposal, and provide each with two efficient workmen—one on rock excavations and one at the head of the slate-making department.—3. He should define the particulars appertaining to the working, &c., of the slate-rock, and make these responsible. If it be found, after having made due provision for each "bargain," that there remained some good hands unprovided for, these (if agreeable to all parties) might join the former in partnership, or engage with them as "wages men." By this arrangement two-thirds of the quarrymen would have to make terms with the various contractors, and as they could not secure "partnerships" would be compelled to accede to the "wages system." It will now be seen at a glance that their "brother labourers" are fully cognizant of their short-comings, consequently they know the actual worth of their services; and, although, whilst working on their own account, their wages invariably ranged from 25s. to 35s. per week, they can now only obtain (at the best) from 18s. to 24s., according to merit. Why should there be this difference? The fact is, they were never worth more, and not even so much, when there was no hand to guide them in performing their duties; therefore, the excess of fair wages had been made at an immense sacrifice to their employers. As soon as the men apprehend the cause of this change in the "letting" system, all who possess ambition sufficient to provoke a spirit of emulation, will set to work in real earnest, in order to become qualified for a higher and more remunerative position. It would not be long before their prompt and praiseworthy efforts would be rewarded by the parties for whom they are working, as they could not long continue ignorant of the advantages resulting from the improved state of affairs, and, consequently, from the force of circumstances, would be compelled to grant an increase of wages. The "circumstances" referred to are these—other contractors soon perceive that their services are fast increasing in value, which fact in

itself promotes competition, therefore an opportunity is afforded them of hiring in the best market. The agent also marks their progress, and when opportune, he gives them a chance as chief of some one of the slate bargains. JOSEPH KELLOW.

Tremadoc, Dec. 10.

#### MR. KELLOW'S LETTERS ON THE SLATE TRADE.

[From the Carnarvon and Denbigh Herald.]

SIR,—We have read the letters written by Mr. J. Kellow, on Slate Quarries and the proper way to work them, with much interest, and with desire, by your permission, to express our high approval of the independent, straightforward manner in which he has treated the subject. We fear, however, that, notwithstanding what has been written upon this question, until quarry masters place in command of their works men of his cast, the much-needed improvements so ably referred to by him will not be introduced. We confess ourselves unable to discuss this subject in English, but hope that the friends of this great and increasing source of trade will give the points raised an early and impartial consideration; this being done, all interested cannot fail to be benefited by the change. Hundreds of quarrymen, like ourselves, would come forward publicly, if necessary, to show their unqualified approbation of the sentiments conveyed in those letters on the "Slate Trade in North Wales." In conclusion, we beg to say that no party feeling has impelled us to this admission, and we make it solely for the good of the trade, without conferring with any person in regard to it. We give our names in full, but prefer that our initials only should appear, for reasons best known to ourselves.

M. G. J. H. W. R. W. W. } Rockmen and  
J. J. J. W. J. O. G. G. } Slatemakers.

#### SLATE QUARRIES—PRACTICAL REPORTS.

SIR,—There really is nothing remarkably perplexing in deciphering the conflicting expositions so often given of slate quarries and slate properties (more than other problematic complications), considering the diversity of character which claim a knowledge of this increasingly important subject. Having been mixed up with the slate business financially for some years, I have taken some pains to procure the best practical advice in order to gain information; and, by the way, I do not regret the outlay for that purpose. I have always found it pay to well reward either scientific or scientifically-practical advice. A fair and simple account of the circumstances that are bound up with this source of industry and commerce will always leave the best impression. I have no sympathy with parties who, to save a shilling, seek their information from ignorant and inexperienced men; I mean such as are ignorant practically. I have myself given great attention to this subject, and, notwithstanding all that I have read and learnt from a practical source (which at times seemed to inspire me with a feeling of sufficiency), I am convinced that it is utterly impossible for book knowledge, or superficial acquaintance merely, to supply the qualifications required to deal with the endless mysteries appertaining to this valuable deposit. There can be no longer any doubt but that it is high time for capitalists to watch their interests more minutely, both in the appointment of a qualified management over their works, and by a more rigid inspection of their so-called "quarry reports." A slate property was lately placed before me, accompanied by a most flattering report; and as I was about to go to North Wales on business, I postponed my reply to certain enquiries until my return. The property, I was told, was worthless, and I learnt that the person who had (at least) allowed his name to be attached to the report in question had been for a long time engaged as a "rubbisher," and that he was an entire stranger to the duties connected with a quarryman's profession. Now, if the opinion of such men (who will condescend to endorse such extravagant reports) be relied on, and capital is expended, &c., in accordance with their directions, why need any person wonder that such undertakings fall short of success? Quarries have failed of success, even where the best practical opinion has been decided in favour of the highest expectations from them, but in nineteen cases out of twenty of this sort failure is attributable to incapacity and bad generalship. My connection with such matters, and my knowledge of facts, has so far schooled me that I know, no matter how valuable the property, it invariably turns out a failure until the right man takes the general charge.

I was much interested last year with the series of letters written by Mr. Kellow, which appeared in the *Mining Journal*, on "The Slate Trade in the United States." A friend of mine not long since returned from a tour in America, and it is due to Mr. Kellow to say that he (my friend), whilst there, gleaned information of the highest character respecting the great and successful discoveries which he brought to light in that country. Large and profitable works are now being carried on, which might to this day have remained a blank had it not been for his exploring abilities and perseverance. I am quite sure that the letters he is now writing, and giving to the public through the *Journal*, on the "Slate Trade in North Wales," are widely appreciated: they not only contain a number of useful lessons so necessary to be understood, both by officials and their workmen generally, but they supply an abundant store of valuable intelligence, by which all can learn more directly how to watch their business to better advantage. I fully concur in the opinion "that the services of men of great practical experience should be secured by all quarry proprietors, upon the same principle as is now generally adopted throughout mining localities." Beyond all doubt, their monthly visits to the works would well repay the extra expense thereby incurred.

Manchester, Dec. 11.

A QUARRY PARTNER.

#### LLANFAIR GREEN AND BLUE SLATE QUARRY COMPANY.

SIR,—In last week's *Mining Journal* I observe a statement made by Mr. Harvey, at the Llanfair Slate Company meeting, with reference to my report upon the quarry. I consider his remark, "that Mr. Harvey carried me with him in his expression of opinion," most impertinent and uncalled for. My report was founded upon my own careful observations of the quarry; and if men would take the opinion of honest, practical mining engineers, instead of the absurd theories of ignorant and vain persons, there would not be the ruin and disappointment which has occurred during the last few years.

1, Chapel-place, Westminster.

T. MACDOUGALL SMITH.

SIR,—I am very much obliged to Mr. Thomas Harvey for his letter and comments upon my report on the above quarry, which appeared in last week's *Mining Journal*. I wish I could say of him as he has inferred of me, that "after enquiring in the locality in which he resides I find he is not known." Mr. Harvey makes a great mistake if he supposes I am going to enter into a public controversy or bandy words and personalities with him, I have neither time nor inclination, and had I the former should consider it a great waste to do so; but I will not allow anyone, much less Mr. Harvey, to dictate to me as to my right to report on any property in North Wales, or impugn my qualification to act with judgment in any matter which I choose to take in hand. I know, Sir, I am asking a great deal in requesting you to publish the accompanying reports to "test my qualification." I may not trouble you with any further correspondence on this subject.

J. HAYWOOD,

Government Engineer to the Shrewsbury and Holyhead Road, and the Menai and Conway Bridges, and the Surveyor of the Northern Division of the Carnarvonshire Road.

The Cwt-y-Bugail Slate Company (Limited), Bangor, Dec. 10.

MR. T. MACDOUGALL SMITH'S REPORT.  
Nov. 8.—In accordance with your instructions, I recently visited the Llanfair Slate Quarry for the purpose of advising you as to the expediency of prosecuting the works any further than they have already gone. I beg now to report the result of my investigation. There are two veins of slate passing through the property in the direction shown on the accompanying plan, a blue vein, about 34 yds. wide, and a green vein, about 75 yds. wide, which dip at the inclination shown on the section. These veins have been pierced by four levels to the extent shown on the section, and in the No. 1 level three chambers have been worked in the blue vein, each about 15 yds. wide, and from 21 to 27 yds. long; and from No. 1 chamber south a sink has been opened 15 yds. wide and 2 yds. high to No. 4 level. During my examination I especially directed my attention to the points named in your letter, and, after careful consideration of the several questions, I have to observe—

1.—The structure of the slate rock in the chambers opened on the blue vein proves hard and very imperfect for being worked economically or profitably; it is interstratified with hard bands; it has not a "true split," and has numerous cross and small joints, which affect the cleavage, and break it with edges bevelled on one side, causing an immense amount of waste, as evidenced by the small proportion of marketable slate produced from the chambers that have been opened; the quantity of slate rock excavated from these chambers being nearly 18,000 tons, and the make of slates only 60 tons. The vein is also crossed by a "post," in the direction shown on this plan. Carefully comparing the slate rock in the chambers with that developed in No. 4 level (from the sink to the southern boundary of the property), I am decidedly of opinion that the slate rock does not improve, and never will be profitably convertible in these coarse and troubled beds of hard rock.

2.—From the unfavourable character of the slate rock I cannot, therefore, recommend any further outlay of capital on the works of the blue vein.

3.—The appearance of the slate rock as laid open on the green vein by No. 2

level—about 37 yds. below the surface—does not show sufficient solidity to make slates at a profit; a hard band, 18 in. wide, appears about the middle of the vein, where the slate rock has been widened in the level, and there are also several of these hard bands intermingled with the vein on the surface; a post also crosses the vein diagonally, as observed in the sink from the surface to the No. 2 level, in the direction shown on the plan.

Where the vein has been opened it is much intersected with small cross-joints, and does not exhibit a close and regular cleavage. This vein would have been better proved by a driftage from No. 4 level. To continue this driftage now from No. 4, through the hard rock to the back of the green vein, a distance of about 200 yds., would cost nearly 2000*l.*, and take not less than two years. Assuming the slate rock proved of a better character than it appears in the No. 2 level, a further expenditure of capital would then be required (about 25,000*l.*) to properly develop and open out the work, and the immense mass of hard rock intervening between the blue and green veins must always be a barrier to profitable working. I have fully considered all the circumstances connected with this property; and the manner in which the blue and green veins of slate rock are affected by the multiplicity of joints, the imperfections in the cleavage, the great barrier of hard rock between the veins, the insufficiency of tipping ground, and the deficiency of water power, are all such insuperable obstacles for the profitable continuance of the work, that I condemn the whole as an undertaking which must end in complete failure, and I strongly advise you to abandon a concern which can only end in ruin and disappointment.

1, Chapel-place, Duke-street, Westminster.

T. MACDOUGALL SMITH.

MR. SPOONER'S REPORT.  
Dec. 6.—Some two or three years since I visited this quarry for the purpose of reporting my views on the same, by request of a gentleman then residing in London. My report was adverse to any prospect of its becoming a remunerative undertaking. I have not been over the property since, and am, therefore, not aware whether any progress at the works has been made, or any further substantial or considerable depth worked, but when I was over there I thoroughly examined the openings and underground excavations, and also the "crop" where visible on the surface. From the inspection then made I found the slate-rock much broken up, and lying wet in all parts from its fractured nature, nor was I able to find any indications to induce me to believe that the veins are broken up to a considerable depth. I observed some slates made of fair quality, but my impression is that it is impossible to work the veins to any profit.

Bronygarth, Portmadoc.

C. E. SPOONER.

R. J. LECKEY'S REPORT.  
Dec. 7.—In reference to the above, although I was not professionally engaged to inspect the works, yet I have much pleasure in giving my opinion of the place, which, indeed, can be expressed in very few words. I went, I believe, through the entire workings, and failed to find any point where indications would warrant a further procedure. I have inspected many quarries in this country and abroad, but never saw one where the rock was so much cut up; all the chambers seem to be of the same character, except in one place, where there appeared to be a fair block, but really of so small an extent that it was nothing to trust to. I was in hopes that after so very heavy an outlay there had been a good find to warrant it, but I failed in obtaining information of this character. From the present condition of the chambers it would be worse than madness to spend proprietors' money in working them, and nothing in the levels was to be seen to allow further openings. There was a proposition to drive further into the green vein; I should be very sorry to risk my professional character by recommending it,—the quality and colour are so like the "Delaboe" that it would never be in greater demand than the latter is, which is not much. Besides, there are very grave doubts as to that quarry ever remunerating the company.

London.

R. J. LECKEY.

Nine Years Manager of the Valencia Slate Quarries.

LETTER FROM MR. JAMES WYATT.  
Dec. 9.—From the many interviews I have had with you (Mr. Haywood) in connection with slate quarry operations, I have no hesitation in speaking with confidence of your qualification to judge of the nature and value of slate rock. If you require any further report on the quarry mentioned by you, you cannot do better than employ Mr. Hugh McKie, manager of our Croesor Quarry, who I consider is perfectly qualified to do so.

Bryn Gwynant, Bodelygelert, N.W.

Late Manager of the Penryn Quarries for more than forty years.

[Mr. McKie's report not having come to hand in time, its publication must be postponed until next week. We have received a copy of a report, written by Capt. James Ray Eddy, on the above quarry, dated as far back as Dec. 10, 1865. It is too voluminous to print in detail, suffice it to say that he recommended the dissolution of the company.—Ed. M.J.]

SIR,—Having seen Mr. Harvey's letter in last week's *Mining Journal*, regarding Mr. Haywood's report on the above quarry, may I request you to favour me with space for the insertion of a few remarks bearing on the subject, which I offer in justice to Mr. Haywood.

At the request of one of the shareholders, I inspected this quarry about 18 months ago. I found the rock so much broken up that it could not be worked to any profit, and stated so in my report. I again visited the quarry recently with Mr. Haywood, and have no hesitation in confirming the report made by that gentleman and Mr. Smith, as to the worthlessness of the property. It can never be worked with advantage and profit to the shareholders.

Having inspected a considerable number of slate properties in company with Mr. Haywood, and my intimate knowledge of him in connection with the Cwt-y-Bugail Quarry, enables me to state with confidence that he is fully qualified to report on any slate vein in North Wales, and I feel certain as to the honesty of his judgment.

Four Croesor, Festiniog, Dec. 10.

E. EVANS.

[As Mr. Harvey seems desirous that the public should know who this Mr. Haywood is, we have much pleasure in supplying the information. He is the Government Engineer to the Shrewsbury and Holyhead Roads, to the Menai and Conway Bridges, and has lately received the confidence of the Carnarvonshire Road Trustees by being appointed one of their surveyors. Mr. Haywood having resigned on his side the best and most reliable opinions on the subject, there cannot be any doubt as to his qualification for the post which he undertook, or the soundness of his judgment.—Ed. M.J.]

#### THE PRINCE OF WALES SLATE COMPANY (LIMITED).

SIR,—A paragraph has been going the round of the papers, stating that on Friday, November 29, the appointment of Messrs. Smart and Hammack as liquidators of this company was confirmed. Pray oblige me by inserting the following documents, which will, I think, exhibit a course of proceeding seldom witnessed, even under the appetising influence or "a winding-up" prospect. No order for winding-up has yet been made, nor is one likely to be made, as the petition stands over, on my opposition, to the 21st inst.; and if an order had been by accident obtained, no one could believe that it would be allowed to stand, in opposition to the interests and manifest wishes of at least five-sixths of the shareholders.

General Manager of the Prince of Wales Slate Company (Limited).  
33, King-street, Cheapside, Dec. 11.

P.S.—Should you not have space for their insertion, I may mention that the first paper contains resolutions of the board on November 20, calling upon the liquidators to withdraw their petition, and instructions to the solicitor of the board to oppose in the event of it not being withdrawn. The second paper is a letter addressed to the Chairman, complaining of his conduct at the meeting on Nov. 29, and showing how shareholders holding more than 6000 shares were defeated by a few parties holding 835.

#### THE CAUSE OF THE DEPRESSION IN TRADE.

A DIALOGUE BETWEEN A LIVERPOOL MERCHANT AND A MANCHESTER MECHANIC.

SIR,—In a recent journey from London to Liverpool I chanced to be seated near a merchant and mechanic, who appeared to have known each other previously. The merchant accosted the mechanic, saying—How glad I am to see you; but I have missed you lately—where have you been living?—I have not lived anywhere for the last fourteen years.

Then you are travelling?—No, Sir; I have not money to travel.

Then what are you doing?—Very little.

You used to do a good business, and come out well?—I did before the first Exhibition was got up; that was the cursed mode that ruined me and all the English mechanics.

Do you think so?—To my sorrow I know it; I could live before, and was second to no mechanic, but now I starve.

Will you show me how your present position could arise out of the Great Exhibition? What could that have to do with it?—Why, Sir, you are almost the only man I have met with that has not felt the effects of it.

Well, I may have felt the effects of it; I certainly have not taken your view of it. Will you show me in what way it affected the mechanic, then I shall see if it has affected me as an exporting merchant. For I know there is something going wrong with us, as we are doing but little business, and that at a ruinously low price; so that, to a certain extent, I agree with you, for the merchant is now living nowhere; but explain how the Exhibition could effect you or me?—That needs but little explanation, further than I have not now any goods to manufacture at such a price as I can earn bread for my family. I have three grown-up sons, with nothing for them to do. Let me ask you whether you can now ship your goods at such a remuneration as you did before the Exhibition?—I certainly cannot ship goods at such a remunerative price as I could years ago; in fact, times are so bad that I can obtain but few orders to ship at any price, and money is so tight that I can get but little from the foreigners. This I try to account for from different occurrences. I have not hitherto thought of charging the Exhibition of 1851 with it.—I thought every merchant and mechanic had discovered ere this how it affected him; but to explain it, I need only remind you that every man in England has a right to take a patent for any new thing he invents, and England had long, long before the first Exhibition established a trade under a patent right of her own in all the ponderous metallic substances. She had the best trade in the world. She was backed by all the metallic resources of almost every kind, and endless coal fields at her command; thus, she had brought her smelting-furnaces and her manufacturing appliances to such perfection as to enable her to undersell, and monopolize the trade of the world. It carried her, I may say, to the top of the tree, or the zenith of her glory. She might be said to have had a world-wide fame, and was possessed of every material to carry it out from her own resources. Well might Napoleon I. have said



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